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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/931,177 | 08/17/2001 | Nicole Schodel | LINDE-567 | 1429 |

23599 7590 12/01/2005

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EXAMINER

DUONG, THANH P

ART UNIT PAPER NUMBER

1764

DATE MAILED: 12/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.



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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/931,177
Filing Date: August 17, 2001
Appellant(s): SCHODEL ET AL.

Schodel et al., and the assignee, Linde Aktiengesellschaft
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed September 25, 2005 appealing from the
Office action mailed January 25, 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

| | | |
|-----------|-----------------|---------|
| 6,168,765 | Romatier et al. | 01-2001 |
| 4,043,945 | Fukui et al. | 08-1977 |
| 3,637,353 | Smithson et al. | 01-1972 |
| 5,817,595 | Tejada et al. | 10-1998 |
| 4,508,691 | Adams et al. | 04-1985 |

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1, 5-10, 26-29, and 32-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Romatier et al. (6,168,765). Regarding claims 1 and 32-35, Romatier discloses a reactor (Fig. 1) for performing a heat-conditioned catalytic reaction in a process fluid, said reactor comprising: plates (11) that are arranged parallel to one another at a distance and that form flat channels (Col. 8, lines 22-25) or corrugated with

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grooves (Col. 8, lines 58-61) with lateral boundary areas that face one another, wherein a portion of said channels contain a solid catalyst (15, 23), (Col. 7, lines 51) and carry a process fluid, and another portion of said channels carry a heat transfer medium (16) in indirect heat contact with the process fluid, wherein said plates are flat or are provided with grooves or ribs (Figs. 2 and 3) and are coated at least partially with a catalyst on the surface that faces the process fluid (Col. 7, lines 53-54) ; wherein said lateral boundary areas are jacket pieces (plate closures, Col. 7, lines 18-20 and Col. 7, lines 31-33), which form a pressure-resistant cuboid block with said channels, plates, and with collectors (manifold volume 18) for the process fluid the heat transfer medium (Col. 7, lines 31-33). It is submitted that the recitation of "the lateral boundary areas are jacket pieces, which form a pressure-resistant cuboid block" is no more than a "housing" or plate closures (Col. 7, lines 18-20 and Col. 7, lines 31-33) as shown in Figure 1 or cylindrical housing 37 with top plate closure 42 and bottom plate closure as shown in Figure 4. Note, conventional plate-type reactor has boundary jacket pieces or plate closures to fasten and seal the plate channels together by ASME design requirement. With respect to the reactor capable of operating more than 25 bar, it is submitted that Romatier discloses a reactor made of the same structure as the claimed invention as described above and Romatier also discloses the reactor is capable of carrying out the same process (Col. 1, lines 29-37 and Col. 3, lines 10-15) as disclosed by Applicant (pages 6 and 7). In view of Romatier, one of ordinary skilled in the art would have expected the reactor of Romatier is capable of operating more than 25 bar being the fact that Romatier discloses a reactor with the same structure and a reactor carrying out

the same process as the claimed invention. Regarding claim 5, Romatier discloses plates have catalyst coating on both sides of the sheets (Col. 7, lines 50-55). Regarding claim 6, it is conventional to provide a support medium and/or metal carrier for the catalyst layer and it would have been obvious to do so here to provide supporting structure for the catalyst layer. See USPN 3,637,353 (Col. 6, lines 11-29); USPN 5,817,595 (Abstract); and USPN 4,508,691 (Abstract). Regarding claims 7-8 and 29, it is conventional to provide a catalyst layer with such thickness ranges to ensure optimum catalytic activity is obtained. Note, if a layer is too thin, catalytic activity will not be obtained. On the other hand, if a layer is too thick, it will likely to peel off due to internal stress and also reduces heat conductivity (See USPN 4,043,945). Regarding claim 9, Romatier does not disclose expressly the use aluminum plates. However, it appears the selection of metallurgy for the plate material is an obvious matter of design choice depending on the process requirements such as process fluid and its operating temperature and pressure. Furthermore, Applicant has not disclosed criticality or unexpected results for selecting an aluminum material as the plate material; therefore, it would have been obvious that the plate material of Romatier will provide same heat transfer performance as the claimed invention. Regarding claim 10, Romatier discloses the plates are made of stainless steel material (Col. 8, lines 18-20). Regarding claim 26-28, Romatier discloses the width of the process channel of 0.5-5mm (Col. 8, lines 16-16) and distance between the plates is 2.5 to 20 mm.

2. Claims 3-4, 25, and 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Romatier '765 in view of VanDyke (5031,693). Regarding claims 3-4 and 30-31, Romatier fails to disclose the process channels contained corrugated or pleated sheets with perforations which form passage for the flow of process fluid. VanDyke teaches heat exchanger (Abstract and Fig. 2) with channels having corrugated or pleated sheets (8,9) with perforations (10) to maximize intermixing and turbulence (Col. 1, lines 58-62) and improved heat transfer coefficient (Col. 5, lines 61-68). Thus, it would have been obvious in view of VanDyke to one having ordinary skill in the art to modify the apparatus of Romatier '765 with corrugated or pleated sheets with perforations to gain the above advantage. Regarding claim 25, Romatier discloses the width of the process channel of 0.5-5mm (C. 8, lines 16-16).

(10) Response to Argument

Applicants' arguments filed on September 27, 2005 have been carefully considered but they are not persuasive

In summary, it is submitted that essentially the only real issue present is whether USPN '765 discloses the feature of a "lateral boundary areas are jacket pieces, which form a pressure-resistant cuboid block" as claimed. As described in the above office action, USPN '765 discloses such feature. Examiner draws Applicants attention to the original specification (page 5, lines 11-19 and page 9, lines 3-9) where Applicants discloses "the lateral area can be designed as jacket pieces, which form a pressure-resistant cuboid block with channels formed by the plates and collectors for the process fluid and for the heat transfer medium." It is submitted that the recitation of "the lateral

boundary areas are jacket pieces, which form a pressure-resistant cuboid block" is no more than a "housing" or plate closures (Col. 7, lines 18-20 and Col. 7, lines 31-33) as shown in Figure 1 or cylindrical housing 37 with top plate closure 42 and bottom plate closure as shown in Figure 4. Note, conventional plate type reactor has boundary jacket pieces or plate closures to fasten and seal the plate channels together by ASME design requirement.

(1) Applicants argue on page 4, lines 18-28, *"the lateral areas of the reactor embodiments disclosed by USPN '765 are where distributors/collectors are connected, not jacket pieces as recited in appellants' claims 1, 32, and 34."* Examiner respectfully disagrees, Figure I shows plates or other enclosures (Col. 7, lines 17-21 and Col. 7, lines 31-34), which constitute "lateral area jacket pieces" and such plate enclosure or housing facilitates in sealing the plate channels. Figure IV also shows a plate reactor arranged in a cylindrical housing 37 and such housing constitutes "jacket pieces", which encloses the plate channels.

(2) The argument with respect to conventionality of providing a support medium to support the catalyst layer is evidenced by cited references USPN '3,637,353 (Col. 6, lines 11-29); USPN 5,817,595 (Abstract); and USPN 4,508,691 (Abstract).

(3) The argument with respect to USPN '765 fails to disclose "catalyst layer has a thickness ranging from 1-500 um. Examiner respectfully disagrees. Applicants' original specification (page 6, lines 5-7) merely discloses "the catalyst layer can contain a support medium. The catalyst layer can have a layer thickness of, for example, 1 to 500

um, preferably 10 to 100 um." Applicants merely disclose such broad range and fails to disclose criticality and/or unexpected results for having such catalyst layer thickness and therefore, it would have been obvious in view of USPN '765 to one having ordinary skill in the art to provide such thickness by design choice. Furthermore, USPN 4,043,945 is cited to show the criticality for having an optimum catalyst layer with a certain thickness as described in the above office action.

In conclusion, the applied references disclose the claimed invention. For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

TD

TD

November 28, 2005

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